

### **A novel conductometric urea biosensor with improved analytical characteristic based on recombinant urease adsorbed on silicalite**

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In medical diagnostics, determination of the urea level is an important routine test since urea is the end product of protein metabolism and the main nitrogen component of urine. Under certain pathological states urea concentration exceeds the normal range (2.5 - 7.5 mM in the blood). Additionally, high level of urea in blood can be caused by chronic or acute renal failure (50-70 mM and 120-150 mM, respectively), urinary tract obstruction, dehydration, shock, gastrointestinal tract bleeding. These abnormal levels of urea can be reduced by hemodialysis.

In this manuscript we report development of the conductometric biosensor for the urea detection. Urea biosensors were created using nontypical method of recombinant urease immobilization via adsorption on nanoporous particles of silicalite. Major silicalite parameters were studied using scanning electron microscope and XRD analysis. It should be noted, that this biosensor has a number of advantages, such as simple and fast performance, the absence of toxic compounds during biosensor preparation and high reproducibility (RSD = 5.1%). The linear range of urea determination by using the biosensor was 0.5–15 mM, and the limit of urea detection was 20  $\mu$ M. It is shown that the developed biosensor can be successfully used for the urea analysis during renal dialysis.

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